

THE HARVEIAN ORATION

1899

G. V. POORE.

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THE

HARVEIAN ORATION

DELIVERED AT

THE ROYAL COLLEGE OF PHYSICIANS

OCTOBER 18th, 1899

BY

GEORGE VIVIAN POORE, M.D., F.R.C.P.

PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, ETC.

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MR. PRESIDENT and FELLOWS,

Two hundred and forty-three years have elapsed since Harvey gave us his estate at Burmarsh in Kent to provide an honorarium for our Librarian and for the endowment of the Harveian Oration.

The first duty of the orator is to commemorate benefactors. Your predecessor, Mr. President, to whom I owe the very great honour of addressing the College as 181st Harveian Orator, often reminded us that every man is a debtor to his profession, and that our Fellows in the hour of their prosperity should remember by gifts and bequests to assist in maintaining the honour and dignity of the College.

It is my privilege to record that during the past year our Fellows have not been unmindful of this duty. Sir Hermann Weber, the munificent founder of the Parkes Prize, has presented one hundred guineas to the College Endowment Fund. Dr. Philip Frank has given a similar sum, and has shown that, although he has cast aside the heavy burden of practice, his interest in that profession, the dignity of which he has so well upheld in a foreign country, is unabated. By the will of my lamented and respected colleague, Dr. C. J. Hare, the College has received five hundred pounds.

Harvey not only built for us a library and museum and gave us an estate, but by his will left us books and certain articles of furniture. These minor benefactions—the “Persia long carpet,” the “embroyed eyed cushion,” and the “andirons”—are very touching. They show how he loved the College, and how he regarded it as the family mansion of the Fellows, where they could meet in comfort on terms of fraternal amity. During the past year our home has been beautified by two valuable additions to our Portrait Gallery. We have received from the Quain family a striking likeness of Sir Richard Quain by the late Sir John Millais, P.R.A., and a portrait by G. F. Watts of the late Sir William Roberts has been given to us by his representatives. Our library has been enriched by the thoughtfulness and generosity of

Dr. F. Payne, the Harveian Librarian, who has presented to it a fine copy of the Latin translation by Linacre, our Founder and first President, of Galen's "De Temperamentis," printed at Cambridge in 1521.

For these gifts and bequests there is no lack of gratitude among us.

We meet upon the day dedicated by the Church to the memory of St. Luke, "the beloved physician," the medical companion of St. Paul.

Without entering upon the vexed question of the precise identity of "Luke, the beloved physician," it may be well to glance for a few moments at the condition of medicine in the first century. Of the state of medical knowledge at this time we are in no doubt. Of two of the best known ancient medical writers—Celsus and Galen—one lived shortly before the Christian Era, and the other about 150 years after it. From their works, therefore, we are able to judge as to the probable attainments of a decently educated physician who lived at a period equidistant from both.

Alexandria was, at this time, the chief centre of learning, in which every department of literature and natural knowledge was provided for. In this famous "teaching university" of the Ptolemies not only had all the wisdom of the ancients been collected, but the students of mathematics, physics, astronomy, geography, zoology, and medicine were

furnished with all the practical instruction possible. Anatomy, the groundwork of medicine, was in an advanced state, and was taught by dissection of the human body. The practice of embalming had been followed in Egypt for centuries before the time when, as we read in Genesis, the body of Jacob was embalmed by the physicians; and it is not surprising that a knowledge of anatomy and disease should have first attained exactitude in a land where "post-mortem examinations" were of hourly occurrence.

It is impossible not to believe that these frequent observations of the dead must have led to the accumulation of facts which were of value to the living.

In the centuries immediately preceding and following the Christian Era there was an enthusiasm for natural knowledge, and the great ones of the earth vied with each other in the collection of books and the provision of facilities for students. In Pergamos, the birth-place of Galen, was a famous library and medical school; and Galen, we are told, studied not only here but also at Alexandria, Corinth, and Smyrna, where (as probably elsewhere) similar facilities existed.

The reader of Celsus cannot fail to be struck with his accurate records of cases, and to be convinced that by this author (as probably by his contemporaries) observation counted for much and mere authority for little. It is well to remember that

the physician of the first century could treat a fracture or dislocation with splints and bandages very much on modern lines; that he could cure a cataract; trephine the skull; and boldly cut for stone without the aid of anæsthetics.

Soot of frankincense was a favourite antiseptic, and his frequent mention of wine and oil for the treatment of wounds bids us remember that Celsus and the "good Samaritan" were trained in the same school.

St. Luke tells us of the woman who "had spent all her living on physicians," an echo possibly of the well-known fact that, in the Roman Empire, specialism in medicine and surgery had, for purposes of gain, been pushed to ridiculous extremes.

It must, however, be remembered that the leaders of medicine at this time were men of wide cultivation. Celsus and Galen had "taken all knowledge for their province," and regarded medicine as one branch merely of natural knowledge in the pursuit of which the best intellects were engaged, and of which, as we learn from Pliny, the literature was enormous.

The physician of the first century had probably mastered Euclid's elements; and Euclid, be it remembered, was a natural product of his time, and his work is an eternal monument to the inexorable logic of facts.

Greek philosophy and Greek medicine as a part of it was grounded on the solid basis of observa-

tion. It was the product of sane minds trained in the pure atmosphere of liberty, and nurtured in sound bodies developed by manly exercises. To the mind's eye it stands out, simple in form, faultless in beauty, eternal in strength; like the temple of Pallas Athenæ on the rock of the Acropolis, which, mangled though it be, still rears its noble form to check our tendency to mental arrogance and to inspire us with the hope that there be things which may outlive the ragings of man and the warring of the elements.

Darkness gradually overwhelmed the enlightenment of the Greeks. Philosophy gave way to mysticism, reason was swallowed up by superstition, and inquiry was strangled by authority. Men engaged in endless speculations, and tried by fire and sword to settle questions which could not be solved by reason—questions which now barely serve to furnish a little damp ammunition for the political pyrotechnist.

Intellectual training was almost limited to dialectics, and men could argue so nimbly and with such faultless logic from phantom premises, as to justify the later witticism that language was given us to conceal our thoughts. Under these blighting influences medicine withered almost to death, and the physicians of the fourteenth century were more ignorant than those of the first century. It is tolerably certain, to take a concrete example, that the beloved companion of St. Paul had a more

extended and more scientific grasp of medicine than the immediate predecessors of Vesalius and Harvey.

But if science in the Middle Ages stood still, the handicrafts progressed, and found ultimate expression in buildings marvellous for their engineering skill and matchless beauty which enshrined all that the most cunning hands, impelled by artistic imagination and devotional enthusiasm, could produce. Science can never know what it owes to the handicrafts. Not only has it been largely recruited from their ranks, but it is obvious that science cannot progress without the craftsman to furnish it with instruments of precision. Chemistry could not exist without the glass-blower; astronomy and microscopy owe their very existence to the optician, while medicine and physiology have advanced *pari passu* with the power of recording and measuring. All branches of science must unite in doing homage to the printer who made the Renaissance possible. Further, let us never forget that the Middle Ages were not without their high ideals, and that the mediæval priests were indefatigable in preaching charity. Many of our asylums and hospitals owe their existence to the exhortations and piety of ecclesiastics. To take only one example, let us not forget that St. Bartholomew's Hospital owes its existence to a mediæval prebend of St. Paul's, and that Rahere, by providing a place in which our Harvey subsequently observed disease, must be

allowed to have some share in Harvey's great discovery.

In briefly reviewing Harvey's life and work, we must in order to rightly estimate his genius take into consideration the circumstances in which he lived.

Harvey was born at Folkestone in 1578, into a world distracted by religious dissension. Queen Elizabeth was excommunicate; the massacre of St. Bartholomew was still fresh in the memory; the Netherlands were fighting Spain for life and liberty; Mary of Scotland was a prisoner waiting her tragic end.

While Harvey was still at his mother's knee he must have learnt how Drake had accomplished his circumnavigation and had returned laden with treasure; and as a lad of ten he may have stood upon the cliffs of Folkestone and have seen how his countrymen, then as now, could sink minor differences in the face of a common danger, as, led by the patriotic Lord Howard of Effingham, our fleet drove the Spanish Armada to its destruction.

Upon this great victory there followed a period of peace, prosperity, and extended commerce. The manor-house was tending more and more to replace the fortified stronghold of the feudal chieftain, a certain evidence of advancing civilisation; men found leisure for contemplative work; and the judicious Hooker began to teach that God revealed

himself in the natural laws of the world as well as in the letter of the Scriptures. Agriculture flourished, and accordingly we find that the promising son of the prosperous Kentish yeoman is sent from the King's School at Canterbury to Caius College, Cambridge. From Cambridge he goes to Padua, where alone in Europe he could receive anything like adequate instruction in anatomy, and where Fabricius *ab Aquapendente* held the torch which Vesalius had kindled, and from which our Caius had brought a vitalising spark to England. At Padua Harvey must have lived in a scientific atmosphere, and may occasionally have formed one of an audience of 2000 persons who hung upon the words of Galileo Galilei, the immortal professor of mathematics. After graduation in 1602, Harvey settled in London, married Elizabeth Browne, the daughter of the King's physician, became a fellow of our College in 1607, succeeded to the post of physician at St. Bartholomew's in 1609, was appointed our Lumleian lecturer in 1615, and in 1618 was made physician extraordinary to James I. It was not until ten years after this that Harvey in 1628, at the age of fifty, published in its final form his ever-famous essay on the Circulation of the Blood.

The thirty years which intervened between the commencement of Harvey's studies at Padua and the publication of his essay (1598—1628) was a period of comparative political tranquillity in which

Harvey, occupied with matters purely medical, found leisure in the intervals of practice for that brooding of the mind which is necessary for the effective incubation of all fertile ideas.

The intellectual and literary productiveness of these thirty years was such as must strike our special wonder. In this period Shakespeare produced "Hamlet," "Macbeth," "Othello," "Lear," and other plays, admittedly the greatest creations of the human mind; Gilbert published his work "De Magnete;" Galileo's discoveries were bringing him into conflict with the Holy Office at Rome; Kepler enunciated his laws; Napier announced the invention of logarithms, and Francis Bacon was busy in issuing his pregnant thoughts.

From 1629 to 1649 Harvey's life was less settled. First, he is appointed by the King to travel with the young Duke of Lennox; next he attends his Sovereign in Scotland, and then goes with Lord Arundel on an embassy to Vienna. This brings us to the year 1636, and three years later we find him appointed senior physician in ordinary to the King, with whose fortunes thenceforward he is closely and personally associated. Harvey was in charge of the young Princes at the battle of Edgehill in 1642, lived with the King at Oxford while that city served the functions of a Court and barrack as well as of a university, and was Warden of Merton College from April, 1645, to May, 1646, when the city finally capitulated to Fairfax.

This made an end of the semblance of Court life. The King was now practically a fugitive and the Royal Household all adrift.

When the King's cause reached its final catastrophe in 1649, it must have brought to Harvey a deep sense of personal loss, for we have abundant proof that the physician enjoyed the absolute confidence of Charles, who at Edgehill confided to his keeping those that were dearest to him, and who chose Merton College as a safe asylum for his Queen at a time when Harvey was its warden.

From 1649 Harvey, who was now a widower, was without a home of his own ; but we find him in the City, or at Roehampton, or at Combe, as the welcome guest of one or other of his brothers, who had so well managed his worldly affairs that he was, despite the troublous times, very well off. He still retained the Lumleian lectureship. It was in 1650 that Ent, in a famous interview, obtained from Harvey the manuscripts of his work on generation. In 1651 Harvey expressed his intention of building a library and museum for our College, which was opened in 1653 ; and the year following he excused himself, on the score of age, from assuming the burden of our Presidency. In 1656 he resigned the Lumleian Lectureship, which he had held for forty years, and in doing so gave us his estate at Burmarsh ; and on June 3rd, 1657, he died at the age of seventy-nine.*

* Some eight or ten generations of men have passed away since

Harvey was a born naturalist. He could not help observing. He was, in this respect, like Aristotle Harvey's time, a period which appears long to the individual, but which is but a brief span in the history of a nation or the history of human progress. In connection with Harvey there are facts which show the continuance of our national life, which seem to bring us nearer to him, and which are not without interest. Our gracious Queen is but eighth in direct descent from James I, to whom Harvey was physician extraordinary. Our Prime Minister comes in the direct line from Burleigh, the great Minister of Queen Elizabeth, and Cecil, the great Minister of James. It was Elizabeth who pensioned Dr. Gilbert; it was Burleigh who befriended John Gerard. Queen Victoria has shown her regard for science by calling two successive Presidents of the Royal Society to the House of Peers, a gracious act which has certainly met with the approval of the Prime Minister, the scientific and philosophic qualities of whose mind are perhaps to be traced to the circumstance that Cecil was the grandson of Sir Anthony Cooke, who was also the grandfather of Francis Bacon.

Again, it is not without interest to remember that the most unsparing critic of Harvey's great discovery among his own countrymen was Dr. James Primrose, the collateral ancestor of another living statesman distinguished for his wit, learning, and patriotism, of whom it may be justly said that he is nothing if not critical.

Sir John Spencer, who was Chairman of the Court when Harvey was elected to St. Bartholomew's, had been Lord Mayor, and was the father of that Elizabeth Spencer who eloped with Lord Northampton, and from whom is descended a well known living enthusiast for municipal government.

Lord Arundel, with whom Harvey travelled, and with whom he was on the best of terms, is only seven generations in the direct line from the present Postmaster General.

Two of the witnesses of Harvey's will, Mr. Heneage Finch and Sir Edward Dering, were his nephews, by virtue of marriage with Elizabeth and Mary Harvey respectively, the daughters of Daniel Harvey of Combe. The present Earl of Winchilsea is only fifth in direct descent from Elizabeth Harvey; while the present holder of the Dering baronetcy is eighth in direct descent from Mary.

or Pliny, Nehemiah Grew, White of Selborne, John Hunter, and Charles Darwin. Like all men who have learnt to distinguish words from facts, his literary style was simple and direct. With him "brevity is the soul of wit." His essay "*De Motu Cordis*," the result of at least twelve years of study, meditation, and experiment, is so simple and direct, and written with such attention to method and logical sequence, that it cannot fail to convince the unprejudiced mind. There is in it scarcely a redundant word, and it may be read in a few hours.

Harvey's passion for observation is made evident by several passages in his life. In his study of the circulation he made use of every living thing within his reach that had a visible heart. When absent with the Duke of Lennox in France in 1631, he writes to Lord Dorchester, that "by the way, we can scarce see a dog, crow, kite, raven, or any other bird, or anything to anatomise." When in attendance upon the King in Scotland in 1633 Harvey escapes from the pomp of courts and ascends the Bass Rock to study for himself this procreant cradle of the sea-birds. When he was travelling with Lord Arundel we learn how Harvey (whom the Ambassador styles "Little Doctor Harvey" and "Honest little Harvey") "would still be making observations of strange trees and plants, earths, &c., and sometimes like to be lost."

After the outbreak of the Civil War we find Harvey stealing a few hours from duty to visit

Percival Willoughby at Derby; and, during the occupation of Oxford by the King, Harvey finds time to be with Bathurst at Trinity College, and study, by the observation of eggs, the progress and way of generation. In short, Harvey's statement to Ent in 1650 that "the examination of the bodies of animals has always been my delight" is abundantly justified by the scanty facts of his personal history.

In the pursuit of natural knowledge Harvey never tired, because "the labour we delight in physics pain." He seems to have risen superior to the political violence of the time, and to have felt that the establishment of the facts of nature was of more importance than the ephemeral questions by which professional politicians seek ascendancy. No man can successfully interrogate nature unless he be constitutionally honest, and it is not therefore surprising that Harvey should have earned the entire confidence of the King and Lord Arundel. It must be admitted that, considering the rancour of the times, he suffered singularly little at the hands of the Parliamentary Party. His papers appear to have been destroyed by a mob which visited Whitehall, but no harsh treatment was ever meted out to Harvey by Cromwell or his subordinates. This fact is probably due, not only to the guileless simplicity of Harvey's character but to the sanity of the reformers. Cromwell could recognise a wise man when he met one, and, although he

knew the uses of fanaticism, he was not one to tolerate the mastery of a mob. One cannot but contrast the safety of Harvey with the fate of Lavoisier, who, a hundred and fifty years later, was hurried to execution with the cry that "The Republic has no need of *savants*."

I have next, by Harvey's bidding, to exhort my brethren to search out the secrets of nature by way of experiment.

Not only is it true that, as Aristotle pointed out, the greatest pleasure in life is contemplation, but the philosophic mind is never dull, and the joys of the successful investigator are probably the greatest which this world has to give.

We are told how Archimedes, when the idea of "specific gravity" flashed upon him, was overcome by a paroxysm of delight.

Surely, also, we may surmise that the sight of the New World on October 12th, 1492, must have more than compensated Columbus for all his toil.

One wonders what must have been the feeling of Horrocks, the gifted contemporary of Harvey, the parish priest of Hoole in Lancashire, who at the age of twenty, having foretold a transit of Venus, which Kepler had overlooked, verified his prophecy by actual observation, on Sunday, November 24th, 1649, in the short and precious interval between matins and evensong.

One can well credit what is recorded of Newton, that when the goal of his great discovery was in sight his mind was so moved that his calculations had to be finished by a friend.

In like manner, the modern investigator, who by infinite pains turns a disease from a word into a fact; and who by careful isolation, cultivation, and inoculation, draws back the veil of mystery, and points the way towards the prevention and cure of a pestilence; surely experiences an unsullied joy such as the victorious general, the idolised plutocrat, the lucky gambler, and the adroitest of Parliamentary hands have no knowledge of.

The soul is invulnerable. The well-stored mind soars above the whips and scorns of time. When, after a period of civil strife unequalled in the history of this country, Ent sought out Harvey in 1650, and asked "if all were well with him?" "How can it be?" was Harvey's reply, "when the Commonwealth is full of distractions, and I myself am still in the open sea." "And truly," he continued, "did I not find a solace in my studies and a balm for my spirit in the memory of my observations of former years, I should feel very little desire for longer life. But so it has been, that this life of obscurity, this vacation from public business which causes tedium and disgust to so many, has proved a sovereign remedy to me." Here we have from Harvey's own lips precious testimony to the content

which is to be found in searching out the secrets of nature.

“Happy is the man that findeth wisdom ;

* * * *

Her ways are ways of pleasantness, and all her paths
are peace.”

Nature is omnipresent, and the study of her affords the best discipline for the mind, for she only yields her secrets to the man of truthful spirit who works with patience.

All that can be said under this head is to be found in the Book of Wisdom, written probably at a period not very distant from the Christian Era, when, as we have seen, there was an enthusiasm for natural knowledge. Of wisdom this writer says :

“He that riseth up early to seek her shall have no toil, for he shall find her sitting at his gates. Her true beginning is desire of discipline, and the care for discipline is love of her ; and love of her is observance of her laws ; and to give heed to her laws confirmeth incorruption ; and incorruption bringeth near unto God ; so then desire of wisdom promoteth to a kingdom. If, therefore, ye delight in thrones and sceptres, ye princes and peoples, honour wisdom that ye may reign for ever.”

That the wisdom of which this writer speaks is such as is got by “searching out the secrets of nature by way of experiment” is scarcely open to doubt, for he says (and it might be Aristotle who speaks) :

“For himself gave me an unerring knowledge of the

things that are; to know the constitution of the world and the operation of the elements; the beginning and end and middle of times; the alternation of the solstices and the changes of seasons; the circuit of years and the position of stars; the nature of living creatures and the ragings of wild beasts; the violence of winds and the thoughts of men; the diversities of plants and the virtues of roots."

The establishment of facts is now recognised to be of such importance that the highest scientific honours are rightly reserved for the disciplined worker who helps in ever so small a degree to increase the sum of the verities. No man of science thinks less highly of a discovery because its practical utility may not be apparent. Generalisations can only be made after the accumulation of many facts, and the fortunate man who demonstrates some far-reaching law of nature must recognise that he owes his discovery to the patient disciplined workers who have made his generalisation possible.

The great generalisations of modern times, such as the laws of gravity, the doctrine of evolution, and the correlation of the physical forces are associated with the names of Newton, Darwin, Joule, Grove, and others, but these famous men all recognised that the stones of which their edifices were built had been quarried, squared, and set by an army of workers without whom the genius of the architect could not be manifested.

Harvey's discovery was not a great generalisation applicable to the whole visible universe, and its importance was appreciable only to a specially educated class.*

Harvey's discovery was nevertheless the first of a series which have exercised enormous influence over human welfare.

Before we possessed a fair knowledge of the physics of the circulation, a proper appreciation of the symptoms of the varied diseases of the circulatory organs, such as syncope and asphyxia, thrombosis and embolism, was impossible. Sufferers who are now treated rationally instead of being tormented empirically have to thank those who have sought out the secrets of Nature by way of experiment.

The fact of the systemic and pulmonary circulations having been demonstrated, men began to

* Although Harvey had probably taught the doctrine of the circulation for ten years before Bacon died, that philosopher gives us no hint that he was aware of it. Harvey's treatise was not finally published until two years after Bacon's death, so that Bacon's silence about Harvey's discovery is not very astonishing. But it points to the isolation of scientific workers before the establishment of the Royal Society, which has served as an invaluable exchange and mart for commodities, compared with which all the gold of the earth is "as a little sand."

Our late President once remarked to me that Shakspeare's appreciation of our profession was not very flattering. This is not to be wondered at, for the doctrine of the circulation was certainly not taught until the year of Shakspeare's death (1616), and before the establishment of this doctrine rational medicine or rational biology was impossible.

search out the reason of this double circulation, but it was not until Priestly and Cavendish and Lavoisier had founded modern chemistry that the relationship of circulation to respiration was fully established. The necessity of fresh air and the quantity needed for the healthy working of the body are now commonplaces. The working classes of this country have shown themselves ready to support politicians who have legislated for more light and air in the house and in the workshop, and some day they will recognise that this advance is really traceable to the quiet workers who have been engaged in searching out the secrets of Nature by way of experiment, among whom Harvey must ever stand pre-eminent.

The microscope has informed us of the various cellular elements which circulate with the blood, and we have learnt, and are still learning, to differentiate various forms of anæmia, to attribute to each its true proximate cause, and to indicate the direction in which relief is to be found. The spectroscope, again, is informing us as to the influence of inspired gases on the blood, and the precise dangers incurred by workers in noxious places. This knowledge has suggested preventive measures and measures of recovery, for which thanks are due to those who have been busy in searching out the secrets of Nature by way of experiment.

The great advance of the latter half of this

century has been the discovery of microscopic parasites in the blood and tissues. It is but fifty years since Davaine demonstrated the *Bacillus anthracis* in the blood, and the facts of a similar order since accumulated have bewildered us by their number and variety. To take only one example, we have attained to a certain knowledge of the physical cause of the plague, which in times past has numbered its victims by hundreds of millions. This disease has been isolated and cultivated. It has been sent half round the world in a tube, and has been re-inoculated in animals. Some of these animals accidentally transmitted the disease to their keeper, who, in his turn, infected his medical attendant and nurses. The disease manifested all its ancient virulence, but a knowledge of the cause enabled the plague to be staid. The much honoured and lamented victims of Vienna have demonstrated to the world at large how the pestilence which walketh in darkness has been illuminated by the full light of science.

We are full of hope as to the good which will follow on the discovery of the malaria parasites in the blood, and their transference by means of mosquitos. The part which insects play in the causation of the diseases of men and animals is proving to be a fertile field of research, and it is not impossible that those who are called upon to take up the white man's burden in the tropics may learn to

appreciate the labours of those who have sought out the secrets of Nature by way of experiment.

There can be no doubt that the rational and methodical observation of disease, assisted by experiment, has had an enormous influence for good on manners and morals. It is to the leaders of medicine that we owe the recognition of the fact that much conduct which we once regarded as sin, calling for cruel and revengeful punishments, is in reality disease, which must indeed be controlled with firmness, but firmness tempered with mercy rather than vengeance. It is probable that one of the causes which has led to the decrease of our prison population and the increase of our asylum population has been the gradual appreciation by the educated public that much disorderly conduct is, in reality, disease. We are more ready now than heretofore to "forgive those that trespass against us." There can be no doubt that our increased power of recognising the early stages of brain disease, a power which we largely owe to those who have sought out the secrets of Nature by way of experiment, has made for mercy.

The average man regards medicine as merely the art of curing disease, and judges of its progress by the degree to which it enables him to enjoy life, often in defiance of common sense and morality. The higher aim of medicine, however, is to point out man's true relationship to his surroundings in this world. Our relationship to our fellow men,

the lower animals, vegetation, the atmosphere, sunlight, water and earth, can only be determined by the study of "the things which are," and by searching out the secrets of Nature by every means which human ingenuity can devise.

The great causes of strife and uncharitableness have been found in questions which are insusceptible of proof. So soon as proof is furnished by an appeal to experiment all excuse for quarrelling is gone. Who now thinks of vituperating his neighbour because of his views as to the movement of the earth or its probable age?

Our study of the things which are makes for good morals. In relation to the purity of air and water the one thing essential is that we love our neighbour as ourself, and that we do unto others as we would they should do unto us. Until the individual reaches this stage of civilisation there can be no permanent advance.

I may, perhaps, here be permitted to state my belief that our relationship to the earth is definite and inexorable, and that until this is recognised by the individual and the individual is encouraged to act as his moral sense directs we shall be in danger of unnecessary overcrowding, sterile soil, polluted rivers, putrid estuaries, and poisonous molluscs.

It is our neglect of duty in this respect which (among other things) is bringing ruin to many of our endowed charities and seats of learning, which, while they derive a diminished income from their

estates, are being crippled by the burden of local taxation, much of which is levied with the express object of carrying fertilising matter to the sea.

Great as are the positive gains of research, the negative advantages are scarcely less important. When a question is moved from the region of conjecture to the region of fact, we not only increase the sum of knowledge but we diminish the stock of error. The need of controversy vanishes, and we cut the ground from beneath the feet of the quack. Those who now "fall into the hands of the physician," are at least not subjected to treatment which has been proved to be useless. This is a negative gain. I do not claim for medicine any monopoly of quackery. That would not be correct. The money-changers are ever in the Temple, and false prophets abound. There are plenty of theological quacks, political quacks, legal quacks, and commercial quacks. There is no quack more dangerous to the Commonwealth than the enthusiastic politician posturing as a philanthropist, ever eager to incorporate each new scientific fledgling in an Act of Parliament, and who forgets that the authority of the law may check progress, as surely as did the authority of mediæval theology. We used to say "*De minimis non curat lex*," but this maxim is scarcely applicable to modern legislation, much of which leads mainly to wasteful litigation, the infliction of trumpery fines and considerable costs, and the maintenance of social parasites.

There have always been two schools of thought in regard to scientific inquiry. One school, fearful lest inquiry into proximate causes should lessen our reverence for the ultimate cause, protests that "all is vanity," and "he that increaseth knowledge, increaseth sorrow." The other school finds in wisdom a spirit "clear in utterance . . . unpolluted . . . loving what is good . . . an effulgence from everlasting light, and an unspotted mirror of the working of God." It is quite impossible not to admit that our increased knowledge of the laws which regulate the visible universe has increased our living faith and added to the glory of God, while it has made it more difficult for men to make gods after their own image and use them for their own purposes. Modern medicine is teaching us that much bodily suffering is due to man's wilful neglect of the beneficent laws of nature. That diseases are due to ignorance and disregard of law, and are not "sent" as scourges by a petulant and capricious deity is clearly a doctrine which, in no way, dims the glory of God.

That "*the steadfast searching out of the secrets of nature by way of experiment is the most promising path to social progress,*" is a doctrine which at no time has commanded universal assent. There have always been fatalists, who have argued that we must accept, without question, what is sent us; that we must bow in submission to a "will" without really seeking to find out what that "will" is.

There have always been trustful souls—saved and half-saved—persons with *idées fixes* to whom mental progress is painful—who see sin where none is, and who find blasphemy in the simplest acts; for, as Shakspeare says, “there is nothing either good or bad but thinking makes it so.” Puschmann records how the nuns of Bologna were offended by the skill and enterprise of Tagliacozzi, the great master of plastic surgery who, as they alleged, had been guilty of blasphemy by presuming to alter the human form. These poor ladies were tormented by voices which repeated the words “Tagliacozzi is damned,” and it is recorded that their phrensy was not quieted until the body of the surgeon had been exhumed and re-interred in unconsecrated ground. It is barely half a century since the use of anæsthetics for the relief of the pangs of labour was denounced as an impiety and contrary to Scripture, and nowadays there are those who object to the simplest and most obvious measures for preventing syphilis, and in the name of purity denounce any attempt to mercifully restrain those whose profession it is to traffick in impurity. The plain practical duty of the physician, however, is to prevent, cure, or alleviate disease by the most direct methods. Those who hesitate to relieve suffering on metaphysical grounds should change their profession.

So, with regard to another burning question, there be those who apparently hold the view that a guinea-

pig is of more value than many babies, and that operations on the lower animals, no matter how carefully and painlessly they be done, if done for the purposes of research, diagnosis, or relief, and not with the object of making mutton tender, pigs fat, or horses quiet, are to be denounced as atrocities. With such as these it is useless to argue. But, seeing that many honoured members of our profession have themselves been vivisected by the envenomed tongues and sharp pens of a few noisy people, it may be well to point out that no conviction for cruelty or breach of law has ever been obtained, and that hearsay and the misinterpretation of physiological writings is not evidence, at least on this side the Channel. The money collected by these strange apostles of mercy is not spent in the Law Courts, where mutual cross-examination would be possible, but in attempts to institute a sort of medical excommunication, and in efforts to dam the stream of charity by sophistical utterances.

Meanwhile, it behoves the medical profession to bear a wary eye lest fanatics should seek to impose immoral tests upon applicants for hospital appointments, tests, be it remembered, which would have excluded Harvey from the service of St. Bartholomew's.

No hospital Governor who coquets with tests of this kind can possibly command the respect of our College, nor can we admit that such an attitude

towards research can do anything but harm to the cause of the suffering poor.

In this country we have always wisely recognised the uses of opposition. The stability of our political organisation has been largely due to the fact that the party in power is subjected to the ruthless criticism of the Opposition, "the toad ugly and venomous" which "wears yet a precious jewel in its head." So it has been in medicine, where scientific advance has been checked not only by the criticism of the learned, but occasionally by the clamour of the prejudiced and ignorant. We have seemed at times to lag behind our neighbours, but our advance, if occasionally slow, has generally been sure. The party of scientific advance is necessarily always a small one, and it is possible that the relatively ignorant may cause some temporary discomfort to the learned few. But this is the extent of their power. The true spirit of inquiry, like the divine afflatus of the poet, is not subject to human control, and the laws of Nature are more permanent than Acts of Parliament.

